

Abstract

Changes in Androgen and Estrogen Concentrations after Human Chorionic Gonadotropin Stimulation in Healthy Women

Background: To assess Leydig cell function before puberty or evaluate defects in testosterone biosynthesis, it is common to measure the response of testosterone to hCG stimulation. Reference values of sexual steroid concentrations after hCG application in males are well established. In females LH/hCG stimulates the theca cells to produce androgens and androgen precursors which are converted into estrogens.

The aim of our study is to measure the response of androgens and estrogens to hCG stimulation in women.

Materials and methods: In 19 healthy women with regular cycles who did not take oral contraceptives we performed an hCG stimulation test (5.000 IE/m² body surface hCG i.m.) at day 7 (follicular phase, f) and day 20 (luteal phase, l) after the first day of menstruation. Blood samples were taken before and at days 2, 4 and 6 after the injection. Serum concentrations of 17-OH-progesterone (17-OHP), testosterone (T), estradiol (E), dehydroepiandrosterone-sulfate (DHEA-S) and androstendione (A) were measured by radioimmunoassay and compared to existing reference values obtained during unstimulated cycles. We compared the medians of stimulated hormone concentrations to the basal medians in each phase in the menstrual cycle. Also, we compared the measured hormone concentrations of the follicular phase to those of the luteal phase to assess interactions of hCG induced changes with physical variations of hormone levels during the menstrual cycle.

Results: Post-hCG concentrations of E increased significantly over the basal state in the follicular phase (31,0 to 60,2 pg/ml, $p = 0.0026$). Post-hCG levels of 17-OHP (f: 86,8 to 199,1 ng/dl, $p = 0.0005$; l: 250,0 to 445,4 ng/dl, $p = 0.0001$) and T (f: 30,0 to 47,9 ng/dl, $p = 0.018$; l: 30,8 to 49,4 ng/dl, $p = 0.039$ [day 4]) rose significantly in the follicular and luteal phase. The highest increases over basal values were noted on day 4. Luteal mean concentrations of 17-OHP were significantly increased over their respective follicular concentrations ($p = 0.0058$). The other steroids showed no significant changes.

Conclusion: We present reference values of gonadal androgens after hCG-stimulation in females. Further investigations of females with different forms of hypergonadotropic hypogonadism are needed to demonstrate the value of this test as a diagnostic tool in the differential diagnosis of disordered endocrine gonadal function in females.

Key words: hypergonadotropic hypogonadism, hCG-stimulation, androgen concentrations, 17-OH-progesterone, reference values